REMARKS

Claims 1-14 were examined. All Claims were rejected. In response to the above-identified Office Action, Applicants amend Claims 1, 5 and 7 and seek reconsideration of all pending claims.

I. Claims Rejected Under 35 U.S.C. § 112, Second Paragraph

The Examiner rejected Claims 1-14 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. In this Response, Applicants amend Claim 1 as suggested by the Examiner to rectify two informalities. In light of the amendment, Applicants request that this ground of rejection be withdrawn.

II. Claims Rejected Under 35 U.S.C. § 103(a)

The Examiner rejected Claims 1-4, 6, and 8-14 under 35 U.S.C. § 103(a) as unpatentable over Applicants' admitted prior art in view of U.S. Patent No. 6,677,217 issued to Joo *et al.* ("*Joo*"). In order to establish a *prima facie* case of unpatentability, the Examiner must show that there is some suggestion or motivation in the references or general knowledge to combine or modify the references, that there is a reasonable expectation of success from such combination or modification, and that the references teach or suggest all the claim limitations. MPEP § 2143. Here, Applicants respectfully submit that this has not been done.

As amended Claim 1 makes clear, Applicants claim a method for manufacturing a ferroelectric random access memory (FeRAM) capacitor, comprising several steps including (f) carrying out a first annealing process for deforming a surface of the second bottom electrode in order to uniformly grow up grains in a dielectric layer along the surface of the bottom electrode. The specification explains how this first annealing process promotes uniform growth in a dielectric layer: the hillocks created when the surface of the second bottom electrode is deformed act as a seed layer for growing up grains of the dielectric layer, thereby achieving a grain growth uniformity of the dielectric layer. (Specification at p. 11, lines 10-15; see also p. 12, lines 19-24.) The uniform

growth of grains in the ferroelectric material of the dielectric layer overcomes several problems inherent in the prior-art method, including electrical shorts, high leakage currents, and other failures related to thermal stresses during fabrication. Furthermore, because the deformed second bottom electrode acts as a seed layer for growing up grains of the dielectric, the dielectric adheres to the second bottom electrode more strongly than if the dielectric was grown and crystallized according to the prior method.

Joo's method, by contrast, is directed at increasing the surface area of a metal-insulator-metal ("MIM") capacitor on an integrated circuit. (*Joo* at col. 3, lines 62-67.) The reference discusses in great detail the methods and conditions under which hemispherical grain lumps may be formed on metal, metal oxide, or dielectric layers, but does not teach or suggest using those grain lumps to uniformly grow up grains in a dielectric layer along the surface of the bottom electrode, as Claim 1 requires.

Furthermore, although the Examiner asserts that increasing the effective area for the capacitor "will also enhance the adhesive property of the lower electrode and the capacitor dielectric," no citation to *Joo* or another reference is given that discloses this property of Applicants' invention.

For at least the preceding reasons, Applicants respectfully submit that the admitted prior art in conjunction with *Joo* fail to teach or suggest every limitation of as required for the Examiner's rejection under 35 U.S.C. § 103(a). Consequently, Applicants request that this rejection be withdrawn.

As to Claims 2, 3, 8, 9, and 10-12, these Claims depend directly or indirectly upon Claim 1, which was shown to be patentable over the prior art and the references made of record in the discussion above. Thus, although the limitations of these dependent claims alone are described as "Prior Art" in the specification, when further limited by their base claim, Claim 1, they describe novel, patentable methods. For at least these reasons, Applicants request that the Examiner withdraw the rejection of these Claims.

As to Claims 5 and 7, the Examiner rejected these Claims under 35 U.S.C. § 103(a) as unpatentable over the admitted prior art in view of *Joo* (*supra*) and further in view of U.S. Patent No. 6,022,774 issued to Kawai *et al.* ("*Kawai*"). *Kawai* is relied upon

for its method of forming a capacitor, which comprises several annealing or RTA steps. The reference certainly suggests that RTA is known in the industry – *Kawai* includes no fewer than four RTA treatments in its preferred embodiment (see *Kawai* at column 4, line 50 through column 5, line 10). However, *Kawai* fails to teach *why* an artisan would choose to perform a rapid thermal annealing step at a particular point in a process. Thus, there is no motivation to carry out a rapid thermal process at a temperature ranging from 400° C to 800° C after step (f) of Claim 4 or after step (h) of Claim 6, as recited by Claims 5 and 7, respectively. *Kawai* is not deficient for failing to teach RTA at all; it is deficient for teaching RTA *too often*. It offers inadequate guidance for selecting the proper points in the method to apply a rapid thermal process to the best effect.

In addition, of course, Claims 5 and 7 depend indirectly upon Claim 1, and as such, are also patentable for at least the reasons discussed in support of that Claim. For at least the foregoing reasons, Applicants respectfully request that the rejection of Claims 5 and 7 be withdrawn.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely Claims 1-14, patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

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Respectfully submitted,
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Lillian E. Rodriguez — September 30, 2004